



## AMES USER OPERATIONS FACILITY



# Real-Time Payload Control & Monitoring on the World Wide Web

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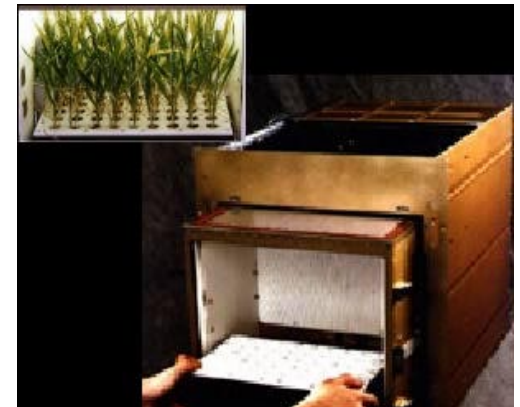
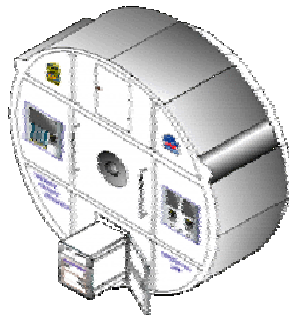


# Space Station Biological Research Project

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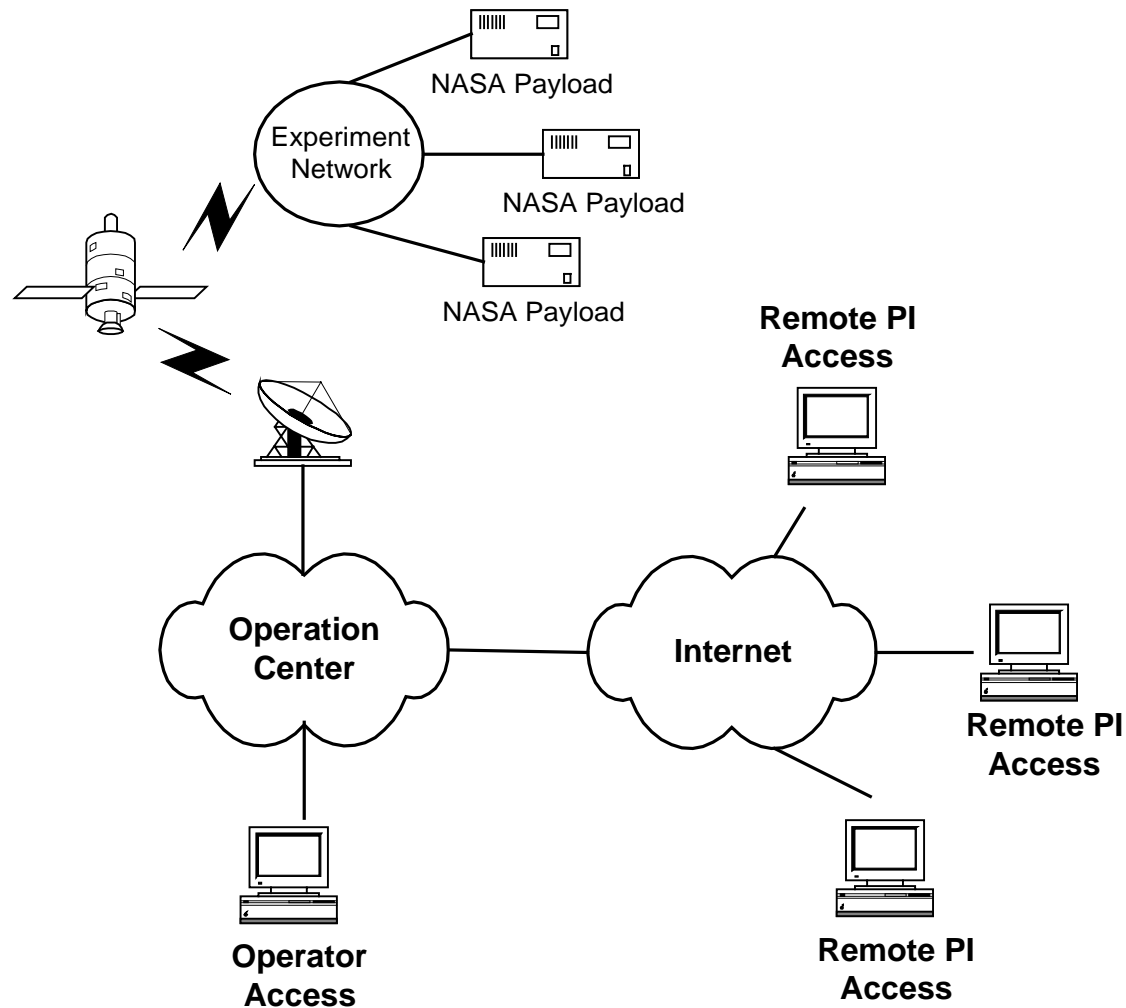
- Life sciences research on board the International Space Station
- Centrifuge, Glovebox, Insect Habitat, Aquatic Habitat, Cell Culture Unit
- <http://pyroeis.arc.nasa.gov>





# Advanced Ground Operation Concepts

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## Software Requirements

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- Graphical User Interface
- Snapshot & Motion Video (MPEG) Support
- Rack Configuration Management Support
- Rule-based Intelligence for Automatic Problem Detection
- Data (Storage) Management
- Platform Independent Distributed Clients
- Internet TCP/IP Ready



# COTS Solutions

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- Java JDK 1.1 has most of the features we need.
  - ❖ Fall 1997.

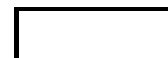
	GUI	Video	RuleBase	Database	Platform	Network	Config
Java	Good	Fair	Fair	Good	Good	Good	Fair
RTworks	Good	Not Available	Good	Fair	Good	Good	Not Available
G2	Fair	Not Available	Good	Not Available	Not Available	Fair	Not Available
Sammi	Good	Not Available	Not Available	Not Available	Not Available	Fair	Not Available
LabView	Good	Not Available	Not Available	Not Available	Fair	Not Available	Not Available
LabWindows	Fair	Not Available	Not Available	Fair	Not Available	Good	Not Available



Good



Fair

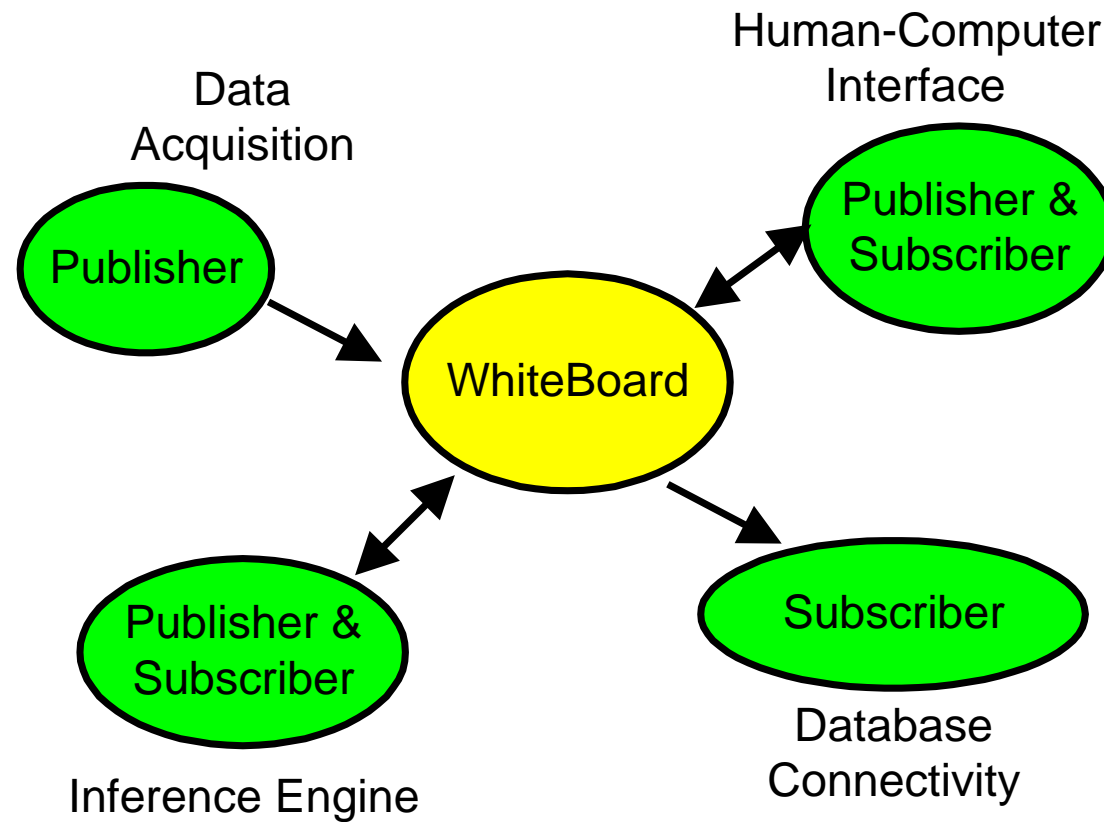


Not Available



# Software Architecture

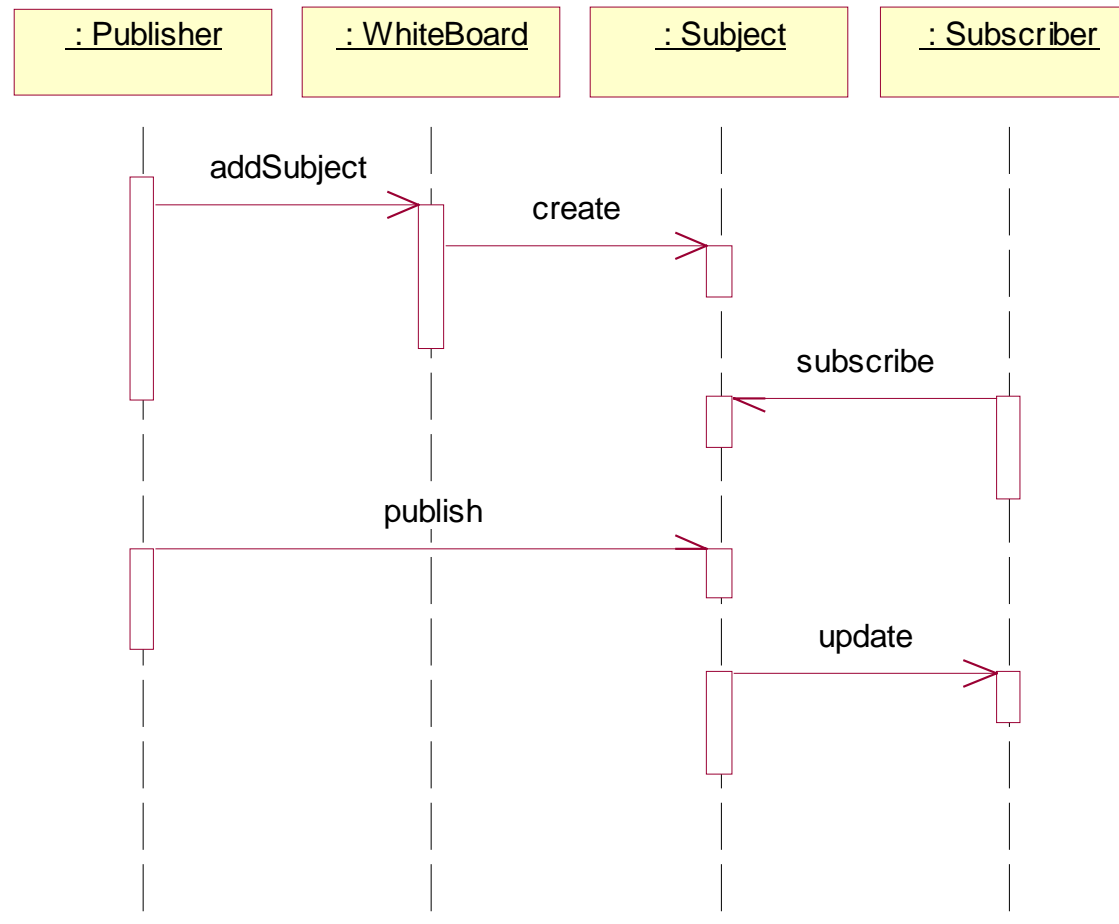
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# Whiteboard Server Implementation using Remote Method Invocation (RMI)

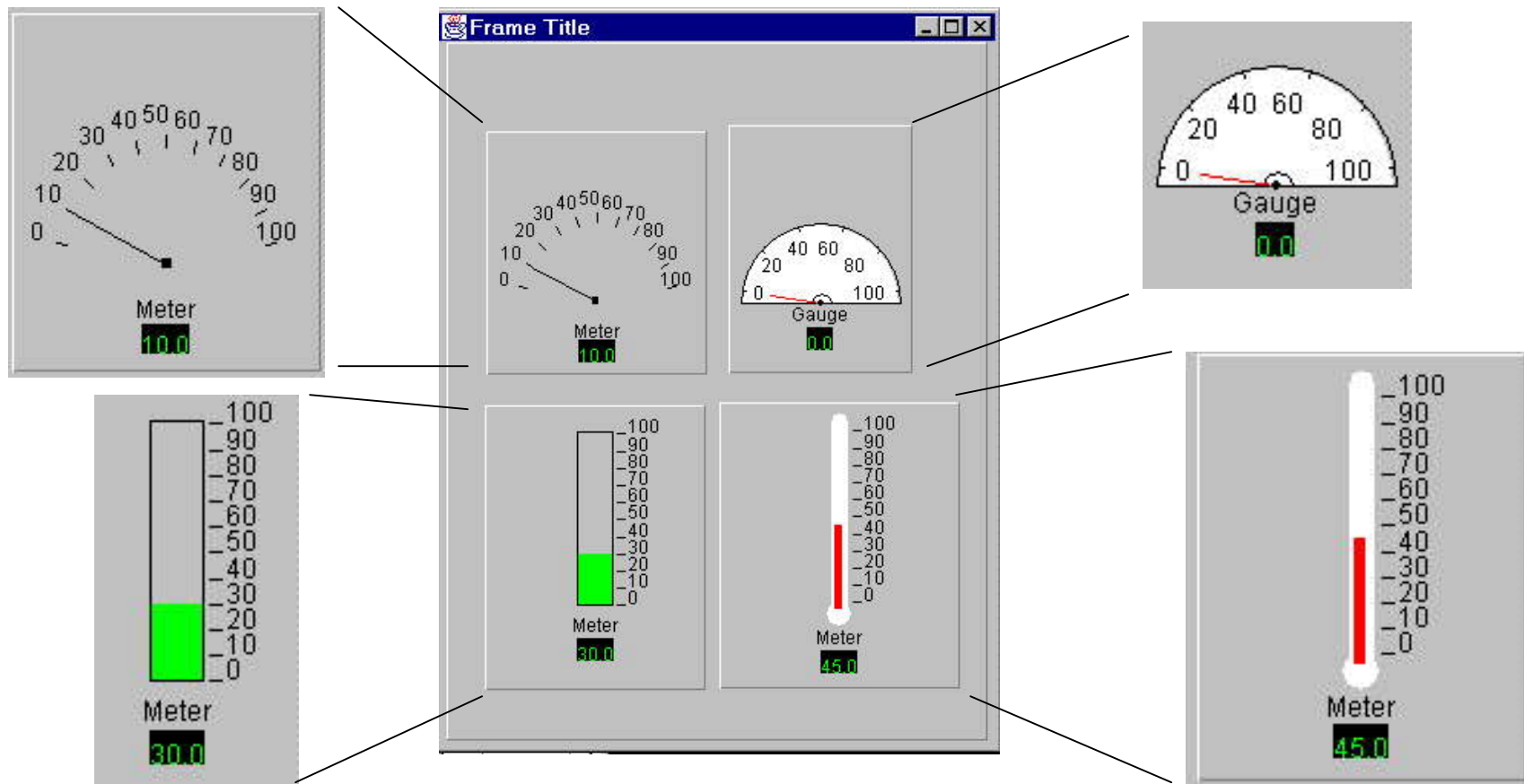
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# GUI construction using JavaBeans

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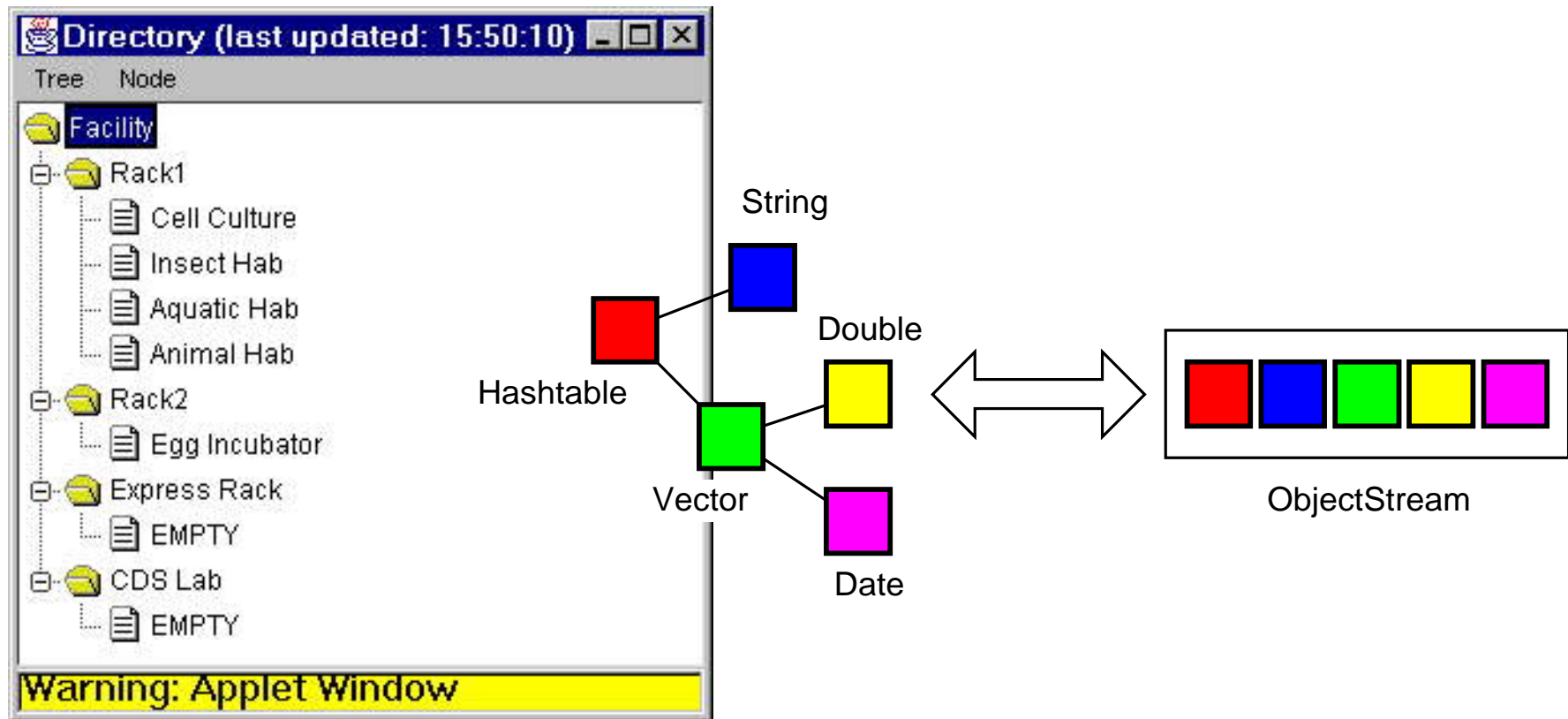






# Configuration Management using Object Serialization

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# Motion Video Integration using Java Media Framework

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➤ Supported by Intel, Sun, SGI

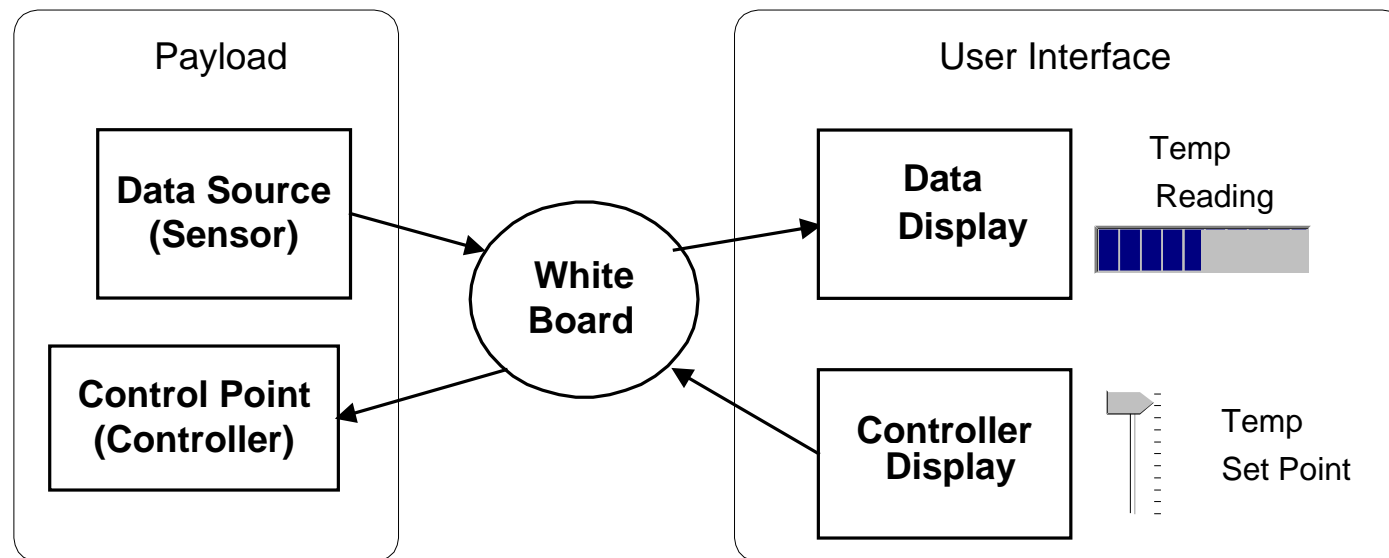




# Java Prototype



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# Top Level GUI







# Rack Display



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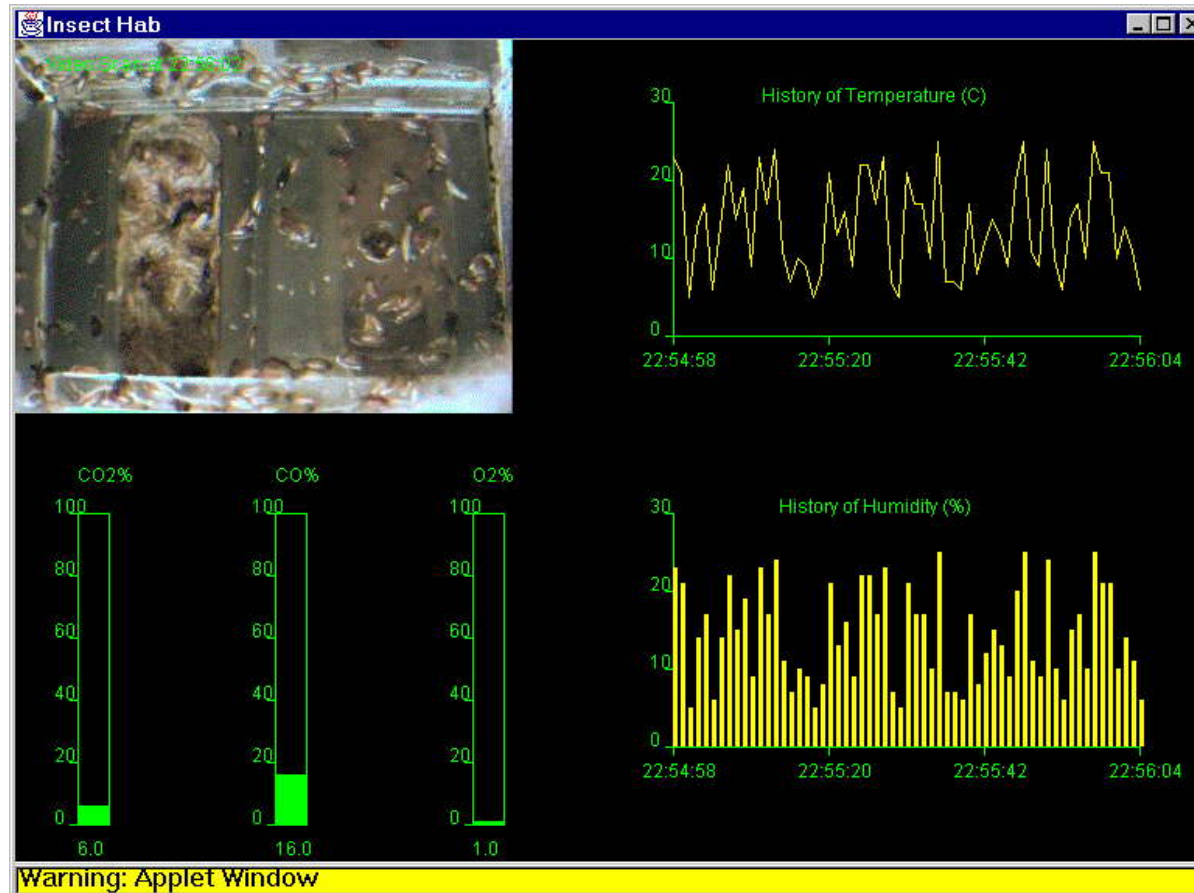




# Insect Habitat Display



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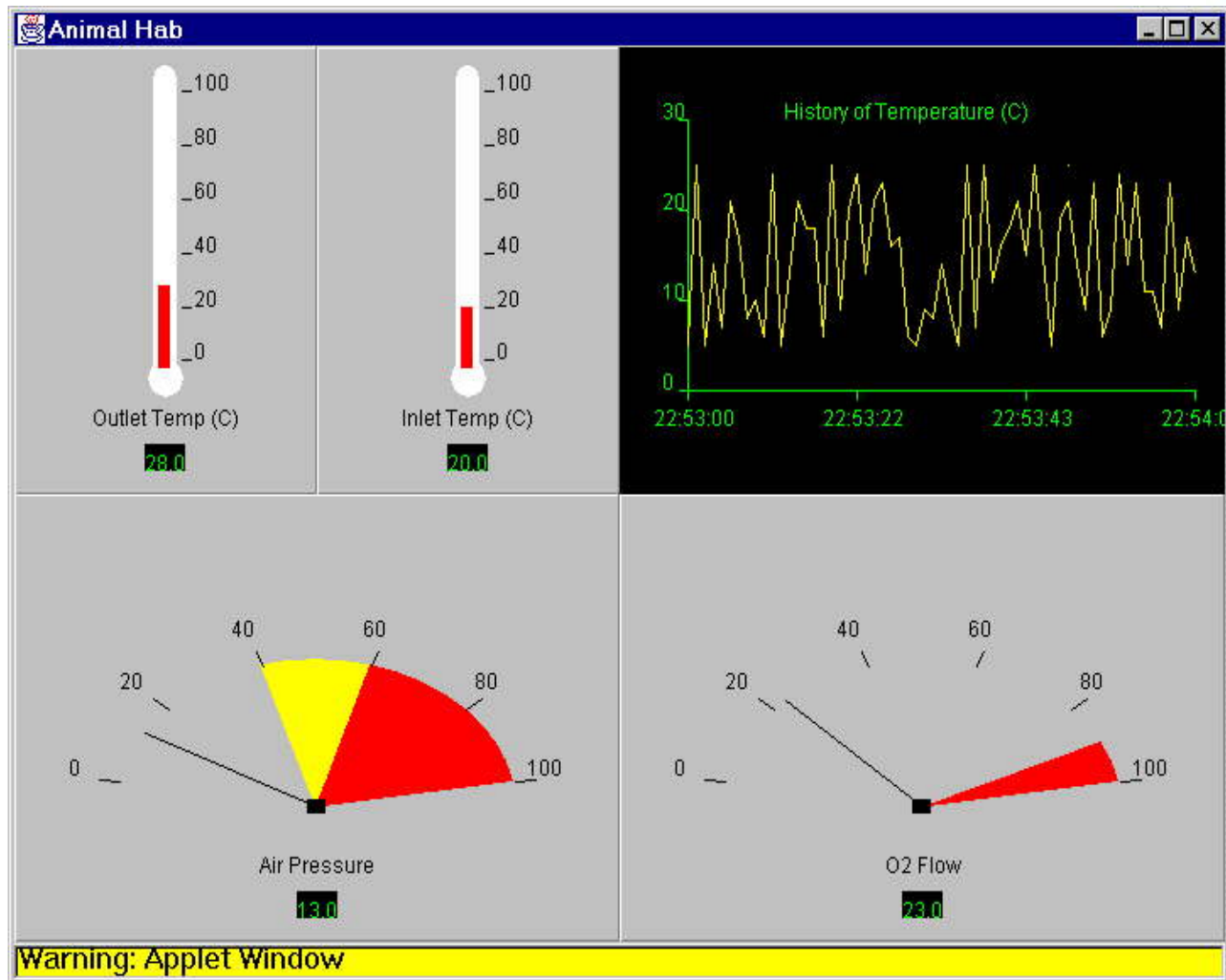




# Animal Habitat Display



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# Intelligent Agent Implementation using JESS

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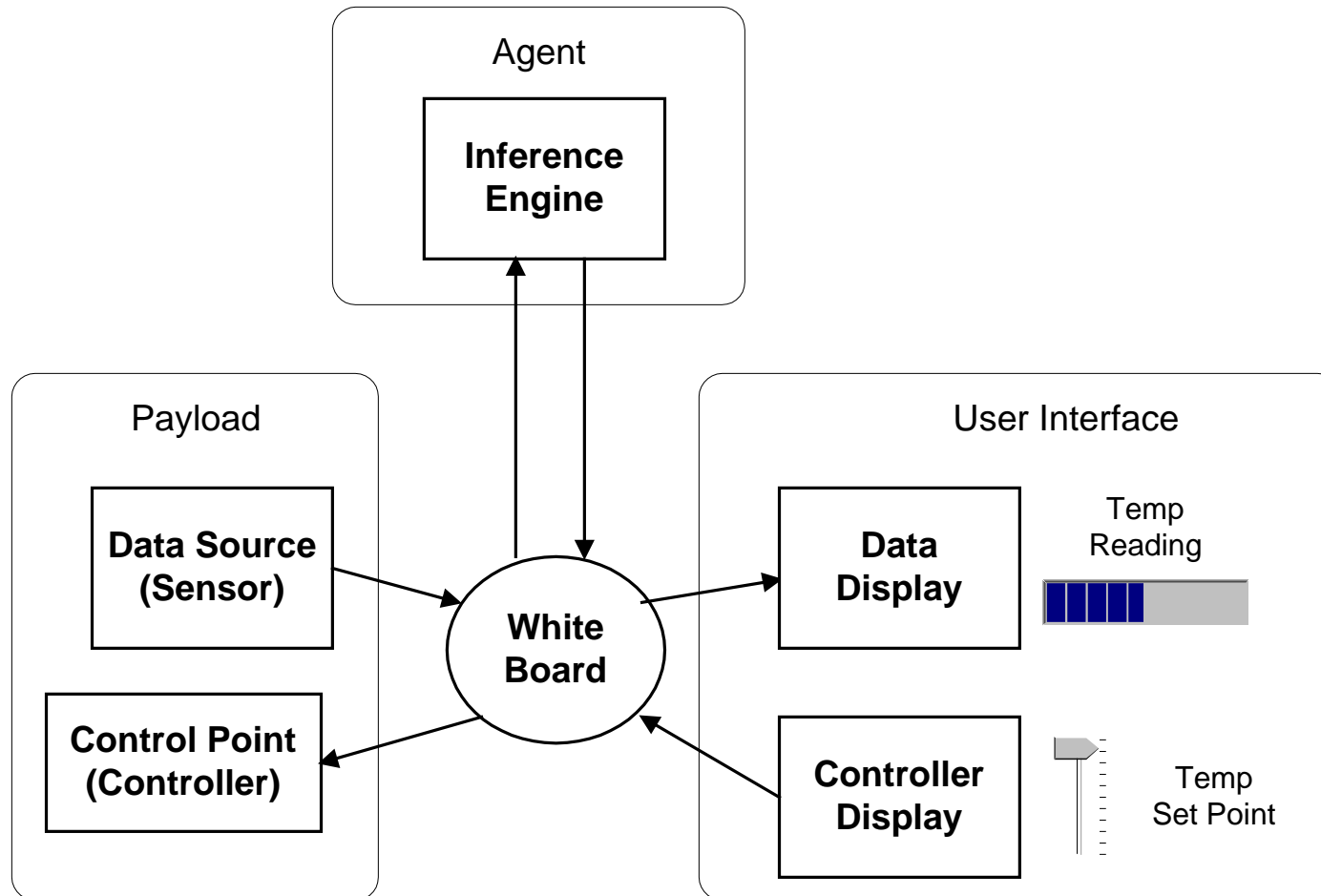
- JESS (Java Expert System Shell)
  - ❖ Java port of CLIPS
  - ❖ CLIPS compatible rule syntax
  - ❖ many sample CLIPS source codes for re-use
  - ❖ good CLIPS documentation available
  - ❖ Free with Java source code for customization
  - ❖ <http://herzberg.ca.sandia.gov>





# Intelligent Agent Implementation using JESS

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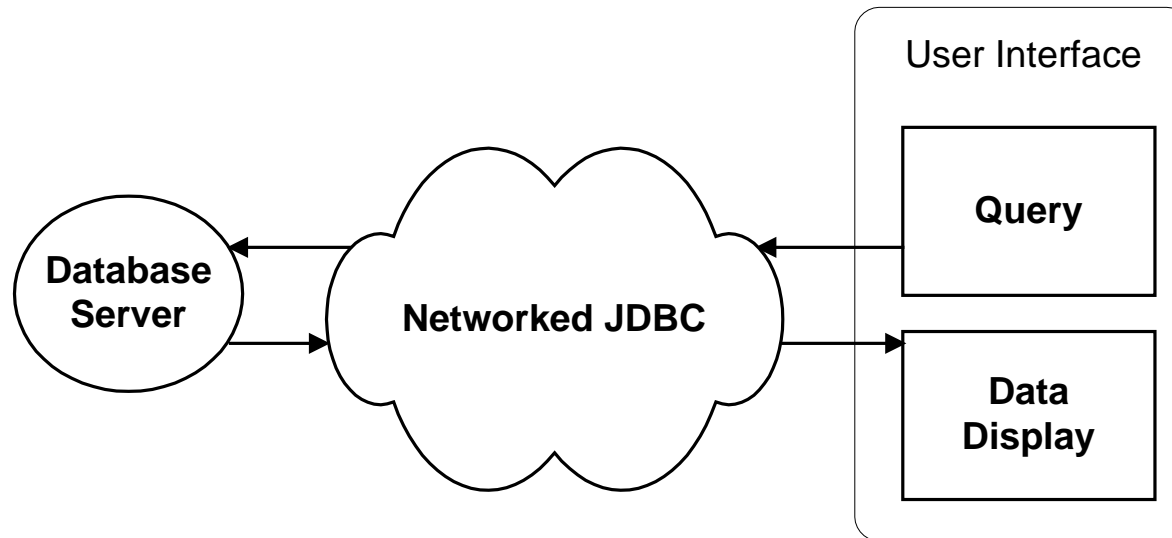


# Database integration with JDBC

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- Weblogic Tengah JDBC
  - ❖ <http://www.weblogic.com>





# Observations



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- Java applet GUI response is slower on NT than Unix.
  - ❖ Solution: Java HotSpot VM
- Object Signing is problematic due to incompatibility between browser software.
  - ❖ Solution: Wait for a standard to emerge
- JMF 1.0 is too limited for serious customization (no user access to image buffer).
  - ❖ Solution: Snapshot image manipulation only
- NS Communicator 4.03 and MS Internet Explorer have problems with RMI.
  - ❖ Solution: Java Activator (Plug-in)



# To probe further ...

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- This slide presentation
  - ❖ <http://geneve.arc.nasa.gov/~csun/weblab/>